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THE long discussions and the labors of a special commission on the question of the Congressional Library have led to nothing more definite than a recommitment of the matter to the Committee on the Library, "with instructions to report a bill providing for a commission of skilled persons to examine and report to Congress, at the next session, touching practicable changes which may be made in the Capitol building, adapted to the accommodation of the two houses of Congress and the library." This leaves the vexed questions as far from solution as ever, with only the contribution of a certain amount of Congressional debate. It will be disappointing to those who have looked with apprehension at the prospect of seeing the Capitol turned over into new hands for alteration, to find that the carefully considered recommendation of the last commission has been set aside, and, as shown by the resolution and the debates upon it, that the prevailing inclination, in the Senate at least, is still in favor of keeping the library in the Capitol, and of increasing the building so as to make room for it.

IT is entirely natural that Congressmen should resist the idea of putting out of their own reach the library which they have collected with care and to which they are accustomed to refer constantly. But the truth is, that the library has long outgrown, not only the space provided for it, but the Congress for which it was itself provided. This was the necessary result of the provision which has been made for its increase, provision that was proper for a complete national library, such as it is desirable on many accounts to have, but to a Congressional library superfluous, and even, as the result shows, embarrassing. Exception was taken, in the course of debate, to the idea of maintaining a national library, or two libraries; but the actual fact, which seemed to escape notice of the Senators, is, that there are already two, and must inevitably be two, to all practical intents, under the system that is in use. That is to say, there is a certain number of books to which Congressmen resort for reference, which they must have at hand; and there is a much larger number for which they have no use, — which, as Congressmen, they practically never see and need never concern themselves about. Moreover, a great part, at any rate, of the smaller number are duplicated in the larger, we understand. This larger number forms a library which is extremely valuable, and invites a great variety of uses. So long as it is in the Capitol it is less accessible for those uses than if it were properly housed by itself, is less secure, and is absolutely in the way in a building which ought to be reserved for legislative needs. It is a general library, — national, let us say, if there is any virtue in the word, inasmuch as it is intended to contain the sum of American literature, — and cannot in reality be anything else, whatever we may call it. A Congressional Library should by all means be in the building where Congress meets, and it is better, we should say, that it should be kept for the exclusive use of Congress; so that there may be no interference from the demands upon it by persons outside. But since space is valuable and bulk inconvenient, it should not include a mass of books for which Congress has no need. If fifty or seventy thousand volumes are enough for all the uses of Congress, as we are told by the librarian, Mr. Spofford, who probably knows more of this than any one else, the other three hundred thousand are better rejected, and put where they are more valuable than they are in its library. A working library of two million volumes for a legislative body, such as there is now talk of providing for, is an absurdity. When Congress began collecting books, two courses were open to it. One was to provide such a limited collection as would best serve its own needs, the other to make its collection as complete as only one supported by the resources of the general government could be, one therefore whose only excuse for existence would be its general uses. Congress has long ago committed itself to the second alternative, and it is as well to recognize the logical conclusion to which it leads.

As concerns the question of architecture, the arguments seem to be on the same side. A number of propositions for enlarging the Capitol to hold the books have been brought forward. There is no doubt that in some way the building can be so adapted as to make room for the library as it is or will be for a few years to come. There is no more doubt that to make it a permanent nursery for a child of such gigantic powers of growth is impracticable. Every few years the same difficulty would recur; the inevitable result would be the conclusion, when the house had been spoiled, that after all father and child could not live in it together. Irrespective of space, a legislative body and a large public library should not try to live together. Each ought to have the supreme control and the sole possession of its buildings, and they require buildings of different kinds. The person whose judgment in regard to alterations of the Capitol is before all others entitled to respect is the architect who gave it its present form, Mr. Walter. His judgment, quoted in the debate, was that to extend the central fronts of the building beyond the twenty-five or thirty feet which he recommended and intended when he added the wings would be disastrous to its design. Such an increase as this would give but short relief, and it is not easy to believe that the more violent alterations which are proposed would be architecturally satisfactory. Mr. Conkling exhibited in the course of the debate a design which, he said, imitated the advancing porticoes in front of St. Peter's at Rome, two extensions being added to the wings of the Capitol at a lower grade on the descending ground at the west. To criticise a design without having seen it is dangerous; but we should think from Mr. Conkling's description, so far as we understand it, that the likeness to St. Peter's must be more in fancy than in reality; while on the other hand most architects are agreed that the things which among the many additions that disfigure Michael Angelo's original conception, and do most discredit to it, are these very porticoes, added by a man who seemed to make it his mission to degrade the work of his predecessors, the mischievous Bernini.

THE interest which has been aroused by the competition of designs for a model tenement-house, set on foot by our enterprising fellow journal, *The Plumber*, and certain gentlemen of New York, bears witness, not only to the judgment of its projectors, but to the importance of the subject and the attention it is receiving from many classes of persons; also, perhaps, to the freedom from the oppressions of business which has encouraged so many architects to give their time to it. Our New York correspondent has given an account of the competition in another column, to which we refer our readers for detailed information. Nearly two hundred designs have been sent in, from thirty different towns, ranging from London to San Francisco, to testify to the interest with which architects have received the competition; and the crowds of visitors who have come to the Leavitt Art Rooms to examine them show how much attention it has attracted from the public. The conditions of the problem were made, designedly perhaps, the most unpromising possible, the building being required to fit a New York city lot of twenty-five by one hundred feet, surrounded by other buildings on all sides but the narrow street front. It was to be of brick, with wooden floors and a fire-proof stairway. Five hundred dollars were assigned in premiums for the best plans, which had necessarily to be studied with an eye to the most profitable use of the land and building, as well as to the comfort and sanitary condition of the tenants. A committee of award has been chosen, in whose judgment and equity everybody will have confidence. They are Messrs. R. G. Hatfield, architect, the Rev. Drs. Hall and Potter, Prof. C. F. Chandler, and Mr. Rob-

ert Hoe; their decision, which at the time when we write is yet to be given, will make chief account of security against fire, lighting and ventilation, plumbing and drainage, seclusion and accessibility of rooms, convenience and economy of plan. The tenement-house question has become so urgent to the people of New York that the most prominent of their clergy have agreed to set apart the twenty-third of this month for a general appeal to their congregations in its behalf.

The prime condition of the plans, which as we have said is the worst possible, is simply this well-known condition of the typical New York house-lot, with only one narrow end open to light and air. This manner of dividing land, which allows of shredding it up into the smallest practicable parcels for individual use, is made to answer for separate dwelling-houses, where the rooms are but three or four on a floor, and where a considerable yard-room is welcomed. But no division could be more utterly hostile to tenement-houses, in which the floors are to be subdivided into many rooms, each of which should have its direct light and air. In using such lots for such building, the owner is driven to choose between covering them with rooms which are dark and unventilated, or giving up a considerable part of his land for the sake of letting light and air into the rest. To make the most successful compromise between these two evils was of course the first point in the problem offered for this competition. It was doubtless offered as the extreme case which comes up to investors for practical solution, and that which therefore would most interest the men who are likely to build tenement-houses. The New York system of division is very wasteful when applied to such uses. Manifestly that lot is best adapted to great subdivision of plan which has the most frontage in proportion to its area; and it would probably be found profitable to pay more for land with more frontage, just as the thrifty carpenter finds that lumber most economical of which least goes to waste. The city of New York, like all our modern cities, was laid out only with a view to the owners of individual houses. The experience of older cities, which have taken their form by a natural instead of an artificial process, shows that the most economical arrangement for housing people compactly is one of narrow streets very near together. The drawings sent in for the New York competition may be of use whether the experiment succeeds or fails. If they show that a convenient, wholesome, and economical tenement-house can be built on the ordinary New York lot, we may look to see houses of this kind built; if they show that it is not likely to be done, we may hope that people will take advantage of the lesson to improve their awkward system of division.

We have spoken once before of the rather singular suit which the ex-Empress of the French and the former Prince Imperial, as heirs of Napoleon III., have lately been carrying on against the French government for recovery of the Imperial collections at Pierrefonds and Fontainebleau. These collections were formed by the Emperor, and shortly after his death a claim for them was submitted to the government. The claim was at first allowed as a matter of course, and the collections were assigned to the heirs by the executive, together with a large indemnity for damage to other private property of the imperial family. The Assembly, however, modified the decision of the ministry, and declared the museums state property, allowing the heirs the diminished indemnity of eight hundred thousand francs. This amount was afterwards increased, but the Empress refused to accept the order of the Assembly, and appealed to the law. The courts have just decided against the title of the imperial family, and the collections will henceforth be considered the property of the French nation. They are collections of peculiar value and interest. That at Fontainebleau was a splendid accumulation of Chinese valuables, bronzes, *cloisonné* work, carvings, and jewels, the French share of the booty taken when the Chinese Emperor's famous summer palace was sacked by the combined English and French expedition in 1860. That at Pierrefonds is a very remarkable collection of ancient arms and armor, of which various illustrations are to be found in M. Viollet-le-Duc's "Dictionnaire du Mobilier Français." A great part of it was the noted Sollikoff collection, which the Emperor had bought, and had increased till it was valued at a million and a half of francs. Apart from the rights and wrongs of the question, it will probably be a satisfaction to most persons who are interested in these collections to know that they will remain in the care of a nation that may be trusted to preserve them, instead of reverting to private hands, out of which they would run great risk of being scattered.

The grounds on which the suit was argued and decided are curious enough to interest other persons than lawyers. The Fontainebleau collection had been claimed as the private property of the Emperor, because he had purchased it out of the "civil list," which was his own allowance, and though the claim, as we have seen, was at first allowed, when it came to the scrutiny of the courts, it was recalled that one of the earliest acts of the Emperor's reign, passed in 1852, had declared that all objects of art which should be placed in the Imperial residences, whether at public expense or not, should become the property of the state. This act had been passed to estop similar reclamations from the family of the deposed Louis Philippe, and thus the Imperial family found itself hoist by its own petard. An attempt was made to evade the act by the rather amusing plea that the Chinese valuables were not objects of art, but only curiosities, a plea which was very naturally rejected. The collection at Pierrefonds, on the other hand, was claimed on the ground that it had not been placed in an imperial house; because, it was argued, the castle of Pierrefonds, which has been restored from a mere ruin by M. Viollet-le-Duc, to his great glory and its own, was rebuilt by the Emperor from his privy purse, and was therefore not an imperial residence, but his private property, although it stood within the state domain of Compiègne, — a plea which, like the other, was overruled.

YOUNG ARCHITECTS.

PROFESSIONAL STUDY.

Any one who compared the work of the average European architect — French, English, or German, for instance — with that of his American fellow, would be likely to find that it differed from the other by a certain air of homogeneity which independently of its other qualities would make it look like the work of the more skilful hand. The homogeneity might be far from perfect; the work might be commonplace and uninteresting, or might show more striking faults, but it would be apt to have after all a more consistent character than the other. There would probably be a look of *savoir faire* against which the American work would stand out with a look that would suggest inferiority, even if there went with it, as there very naturally might, an expression of enterprising vivacity which the other lacked. The difference is mainly in the power of adjustment, the sense of fitness and coherence that comes of deliberate and careful study. It means simply skill, — the technical skill of men who have thoroughly learned their business. In other words, the work of the European architect shows that in general he knows his business better than his American fellow, and the difference appears in characteristics which to the architect show the crowning qualities of his work. If we looked a little further into detail we should be likely to find a narrow range of forms, perhaps also a certain crudeness in the forms used, as if the designer were rather poorly equipped. Both these characteristics — a want of *ensemble* in design, a want of knowledge and refinement in detail — would be likely to impress themselves on the educated foreign architect who should visit this country. He would be likely to set them down as indications of want of familiarity with the things which educated architects are expected to know, and to infer that American architects, as a rule, were not well read in their profession.

In this he would not be so far from the truth as we could wish. Our young men in their student days pick up what they learn, with little effort at education and no system. Those who attend the architectural schools do better in this respect, and the advantage of it shows in their training; but the habit of our people hurries them through their preparation so that the schools are not allowed to extend their drill beyond what is barely necessary to set pupils on their feet. The student finishes his two years of regulated study, and then goes into an office, where all his time and attention are taken up with routine work. Henceforth all his training is in making the drawings he is told to make, watching the work of his master and fellow draughtsmen, and looking over from time to time an architectural periodical or a portfolio of prints and photographs, for amusement's sake, or to pick out here and there a few "motives" and details to press into service in his drawings. Anything like serious study, except in the limited range of the work he is carrying out under direction, is difficult, and practically is not accomplished. The usual result is that the young architects who go out into

practice, as they usually do after two or three years' work in an office, and offer themselves for all the work of a fully equipped architect, have really no equipment but that which the routine of the office work has furnished them, know nothing but what they have learned from the designs which it has been their fortune to work upon, or what they have picked up by observation of those who worked at their elbows.

How slender this stock in trade is apt to be is shown when the young architect gets to work for himself. A few details or tricks of hand learned from the master with whom he has studied, and the architectural common places of his day and neighborhood, accepted without discrimination for want of choice, are his outfit. Practice and natural cleverness have perhaps given him a sort of facility in handling his small stock of forms; and he designs such work of the ordinary kind as falls to him, usually ordinary houses in the country or city, with ease and without discredit as compared with his fellows. He is active-minded and enterprising, however, with a faculty of adaptation which with good training and a fair range of study would have served him in good stead, and with a great readiness to catch at anything that comes in his way, and press it into the service of his work. He is inventive, too, and his architectural work is seldom without some characteristics of its own. When he has definite wants to guide him he is not at a loss; no planning is fuller of ingenious contrivance than that of American buildings, particularly that of dwellings and other buildings whose requirements are well defined and understood.

If this readiness of mind were borne out by a due professional cultivation, our architecture would hold its own very well with the architecture of other nations. We might not have what those desire who clamor for a national architecture, if they desire anything definite; but we should have architecture that would be well studied, homogeneous, and refined, as well as spirited and ingenious; neither trivial, nor coarse, nor fantastic. What are the actual faults of our architecture we have declared too many times to repeat here. If we were to characterize its shortcomings in the most general and concise way, we should say that American architecture was on the whole illiterate. It shocks an educated eye by faults which are not the marks of incapacity, — nor only of haste and want of care, though there are enough of these, — but indications that its authors have not learned their business as designers. Of course there are many exceptions to this, much work that shows both skill and knowledge. But a great part of our architecture, even that of those who set their aim much above the pure vernacular, is visibly the work of men whose eyes are not well trained to niceties of form and proportion, whose minds are but slenderly furnished with material, and who have not learned how to properly select and apply among their small store of forms those that suit their occasion. A very narrow range of work is enough to exhaust all their stock of acquirements, and when they go outside of it they are apt to fall away disastrously from their own standard.

We see this failure conspicuously when our architects are called upon for something outside their ordinary manner of work. One is now and then startled, for instance, to see how this or that architect, who has perhaps a clever knack of designing picturesque country houses, fails helplessly when he essays a civic building that calls for some state and elegance; or how another, of greater fame, who has helped to line his city streets with imposing warehouses and shops, sinks under the burden if his confiding clients charge him with the building of a church. We see it more conspicuously when it comes to the design of purely monumental structures, in which the warmest of considerate patriots has never accused us of much success. If there is no country in the world whose monuments are on the whole so bad as ours, this is due first of all, no doubt, to the fact that so many of them are designed by men who are not architects at all; but also to the other fact that so few of the architects themselves have been trained to a skill in design which will carry them safely through when they are left to their own fancy and power of composition, with no practical needs to show them which way to go, none of the habitual conditions of their work to prevent their running into extravagances. We see it again in the poor results when buildings of unusual importance are put into competition. The proportion of men who are sufficiently trained to deal creditably with unusual designs is not enough to answer to the call of such competitions, which are for the most part not so arranged as to be attractive to them, though they do attract the average practitioner, and still more the inferior one. The gross result is a very small proportion of really good work, but an immense array of mediocrity and rubbish; and yet it is in answer not to a demand for an exhibit of ordinary work, but to a system especially contrived to call out for important occasions the best that can be had.

The thing which in architecture, as in any other pursuit, fits a man for an emergency, or for anything beyond the habitual call upon his powers, is the permanent equipment of his mind. The same cultivation which will give excellence and variety to his ordinary work is more imperatively necessary when he wishes, as all architects do wish, to meet the unusual and exacting problems that will present themselves from time to time. This is especially necessary to a man whose work is mental production which, like an architect's, must be done "on time," and usually on a small allowance of it. Cramming from prints and photographs meets the case but poorly. It is not that which he seizes on at the moment that will serve him for a special effort, except so far as it finds its place in a mind already well furnished. The teaching of his practical routine falls short when he is called aside to do unusual work; hence the uncomfortable air of not knowing what to do, or why to do it, which marks the extraordinary efforts of men of narrow experience. The man who comes up to the occasion is he who takes care to keep his mind stored with more material than he needs for his daily use, and in such order that he feels at once and instinctively what of it can be used together, and for what it will serve; or the man who has ready in his mind distinct and well arranged conceptions, which he has not used, but is waiting an opportunity to carry out. As may be supposed, these two men are commonly the same: the means by which they equip themselves is careful study beyond their daily necessities. The mere every-day work of such men has the same preëminence as their occasional work. They are the men who give shape and movement to the architecture of their generation, who lead the way where others follow, in small things as well as in great.

To consider the reasons of the neglect of study, which certainly is characteristic of American architects as a class, would lead us too far. There are probably many of them: perhaps the most influential is the lack of any tradition of architectural education, and the consequent fewness of those who attend the professional schools. This is increased by, and itself increases, the haste of young architects to get into practice. It is of no use to say that we lack the means of study. Other nations may be more favored in these than we; but we have enough to greatly improve our condition. We have schools; books and illustrations without number are within reach of most of those who will use them. The trouble is rather that we do not use the means we have. There are probably few architects among us who know much of the literature of their profession; not a great many who have any such impression of style or of harmony as would keep them, not merely from grammatical solecisms, which are in themselves of small account, but from such discordance of detail as would offend a sensitive eye if historical styles had never been known. The young men lack the right kind of ambition; when they get older they are too busy, or else are confirmed in negligence. There is, to be sure, a good deal of cursory glancing at photographs and architectural illustrations, collecting hasty and ill-ordered impressions. One hears occasionally the disparaging remark: "Oh, these things are all in the books," as if they were therefore superfluous; but the books are not read. A good many imported books and reprints are sold in the country, but it is only the plates in them that get any attention. The text, however valuable, finds hardly any readers. The few architectural books that are published here find little sale if they are good for anything in the way of study. As for plates or photographs, there is little idea of any careful comparative study of them, such as is necessary to make them valuable. On the contrary, the more miscellaneous the collection, the better its sale. It is not surprising, in view of this habit, that the tendency of our architecture should be toward the fantastic. It sometimes tempts us to wish that such means of education were fewer among us, rather than more. If there is any nation which needs especially to chasten its architecture by reserve and diligent study, it is one that has no traditions and no style of its own, but depends entirely upon eclecticism. That under such an unpromising system — or rather want of system — we can show so much progress in architecture as we have made in the last ten years, inclines one to believe that we must have some special aptitude for it; but our further progress is likely to be slow unless we can steady ourselves by some habits of solid study.

THE OPEN FIRE-PLACE. VII.

SMOKE-CONSUMING FIRE-PLACES. II.

Fig. 41 represents another smoke-consuming apparatus, similar in principle to the preceding, but placed against the wall like an ordinary fire-place. To establish a draught it is necessary to burn some kindlings within the little door placed above the grate before lighting the fuel in the latter. This form of fire-place is objectionable, on account of its liability to smoke upon slight provocation.

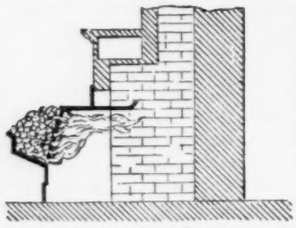


Fig. 41. From Peclet.

Mr. Touet-Chamber attempted to overcome this objection by placing the grate in a niche, as in Figs. 42 and 43, and having two openings into the flue, one above, as in the ordinary fire-place, to use when the fire is first lighted, and one below to reverse the flame.

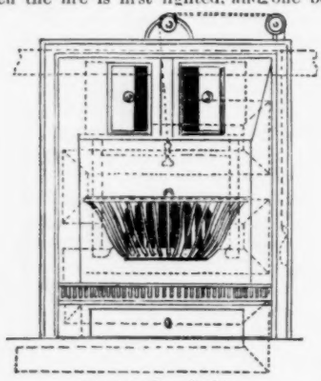


Fig. 42. From Peclet.

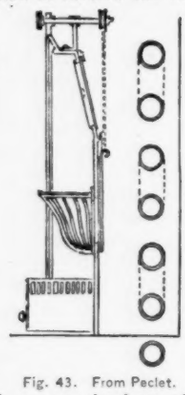


Fig. 43. From Peclet.

He added the tubes behind the fire-back to save the heat of the smoke and flame, by warming in them fresh air from the outside. The position of the upper openings, however, is such that their presence is far from being an infallible cure to smoking, and the objectionable appearance of the fire-place, when partially blackened by smoke, can easily be imagined.

These objections may be removed by certain modifications hereafter to be shown. Franklin accomplished the same result, of consuming the smoke, in a different manner. Instead of reversing the flame, he reversed the grate. The device is shown in Fig. 44. The grate is cylindrical in form and revolves upon a fixed seat. The fresh fuel is thrown in through the door, represented in the figure as opened and supporting a pitcher. This door is opened for the purpose by means of a poker. The door is then closed, and the grate revolved by means of the poker, so as to bring the fresh coals underneath those already burning. By this means the smoke of the fresh fuel is obliged to pass through the fire or red-hot coals, and is ignited.

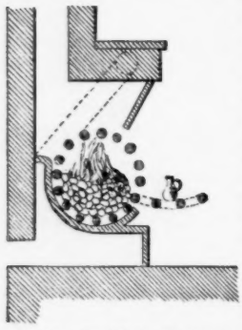


Fig. 44. Franklin's Smoke-consuming Grate. From Labarthe.

In 1815, a Mr. Cuttler took out a patent for a smoke-consuming grate, with a chamber or magazine attached, for containing sufficient fuel to last all day. Fig. 45. The following description is from Rees's "Cyclopedia:" "The bottom plate of the chamber is movable, and, by means of a wheel and axle, the fuel contained in the chamber can be raised so as to bring a portion of it into the grate at the lower part or from beneath, and thus from time to time replace the fuel that is consumed without the trouble of throwing on coals. To make the fuel burn, the flue must be so constructed as to produce a strong draught through and across the top of the fire. Introducing the fresh coals from beneath causes the smoke therefrom to be consumed in passing through the superposed hot coals. Another improvement is to reduce or extinguish the fire; the fire is lowered into the chamber beneath the grate, and is thus deprived of a supply of fresh air, and is consequently soon extinguished." If by this means the smoke could be entirely consumed, soot and chimney sweeping would be unknown, and smoke could not enter the room because it would cease to exist, and a fire so readily extinguished would be a great source of comfort to the anxious housekeeper.

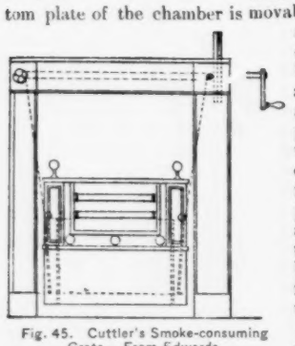


Fig. 45. Cuttler's Smoke-consuming Grate. From Edwards.

Dr. Arnott effected the same object by a somewhat simpler means in his "Smokeless Fire-Place." Fig. 46. His coal chamber has, like Cuttler's, a false bottom or piston supported by a piston rod with notches, in which a catch engages so as to support the piston at any required height. By placing the poker in one of these notches, and resting its point on some fixed support, it may be used as a lever for raising the piston, and bringing a fresh supply of fuel into the grate. Should it be necessary to replenish the coal-box, while the fire is burning, as when the piston has been raised to its full height, a shovel or spade, which may be made for the purpose, is pushed in over the piston to take its place, while the piston is lowered. The spade is then raised in front by its handle, presses upwards the two front bars of the grate, which bars are arranged loose for the purpose, and exposes the mouth of the coal-box, and a new charge of coal is shot in. It is, of course, important that the piston should fit accurately in the coal-box to prevent ingress of air from below, or in other words to limit the combustion to that part of the fire which is visible from the room. In recommending this device, Dr. Arnott stated that the cost of washing the clothes of the inhabitants of London was greater by two and a half million pounds sterling a year than for the same number of families resident in the country, to say nothing of the injury of such articles as carpets, curtains, female apparel, books and paintings, decorations of walls and ceilings, and even the stones and bricks of the houses themselves, from the same cause. He also urged that the frequent washing of hands and face led to an increased consumption of soap; and that many trees and shrubs could not live in a smoky atmosphere like that of London.

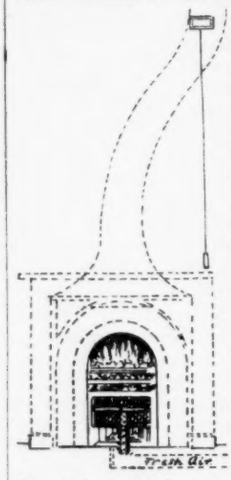
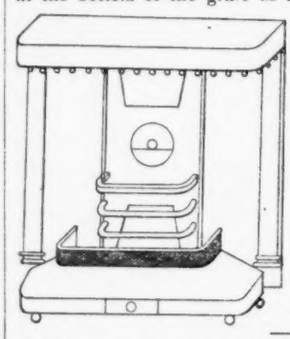


Fig. 46. Dr. Arnott's Smokeless Fire-Place.

Nevertheless the complete combustion of the smoke will not render it wholesome to breathe. Some injury is no doubt caused by inhaling soot; but by passing the smoke through the fire in some smoke-consuming apparatus, while we save the heat, we convert the visible soot into invisible acids, carbonic, sulphurous, and pyroligneous, and ammonia, etc., of which, with water, it is composed.

Figs. 47 and 48 represent the smoke-consuming grate of Atkins and Marriot, an ingenious contrivance, which introduced fresh coal at the bottom of the grate as it was wanted. The section shows clearly how this was done. The idea was to obviate the possibility of the whole body of coal getting into a state of active combustion, as in Cuttler's grate. It either was not understood, or was for some reason practically objectionable, for it does not appear to have met at any time with success, and was soon forgotten.



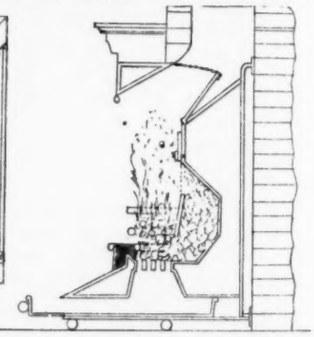


Fig. 47. Atkins & Marriot's Smoke-consuming Grate. From Edwards. Fig. 48.

These smoke-consuming fire-places never came into general use on account of their awkward appearance, and the inconvenience of managing them. They involve machinery which is a little liable to get out of order, and few housekeepers are philosophers enough to be willing to undertake the management of a machine requiring especial mental effort, where the advantages are not directly visible to the senses. The average servant is thoughtless and impatient enough to prefer the primitive method of "discharging an avalanche of coals" upon the fire from the hod, to going through the experiments with the lever, ratchet, wheel and axle, recommended by Cuttler and Arnott.

Moreover, the complete combustion of the smoke, and indeed everything else connected with the fire, has been considered of minor importance, compared with obtaining a "good draught" at any sacrifice. If we assume that but an eighth or a tenth part of the fuel takes the form of unconsumed smoke, and consider that a tenth part of the entire heat generated by the fuel is more than we ordinarily realize, the saving by the use of a smoke-consuming apparatus would, in an ordinary fire-place, amount to only about a hundredth part. It is evident, therefore, that such a refinement on the score of *economy* is

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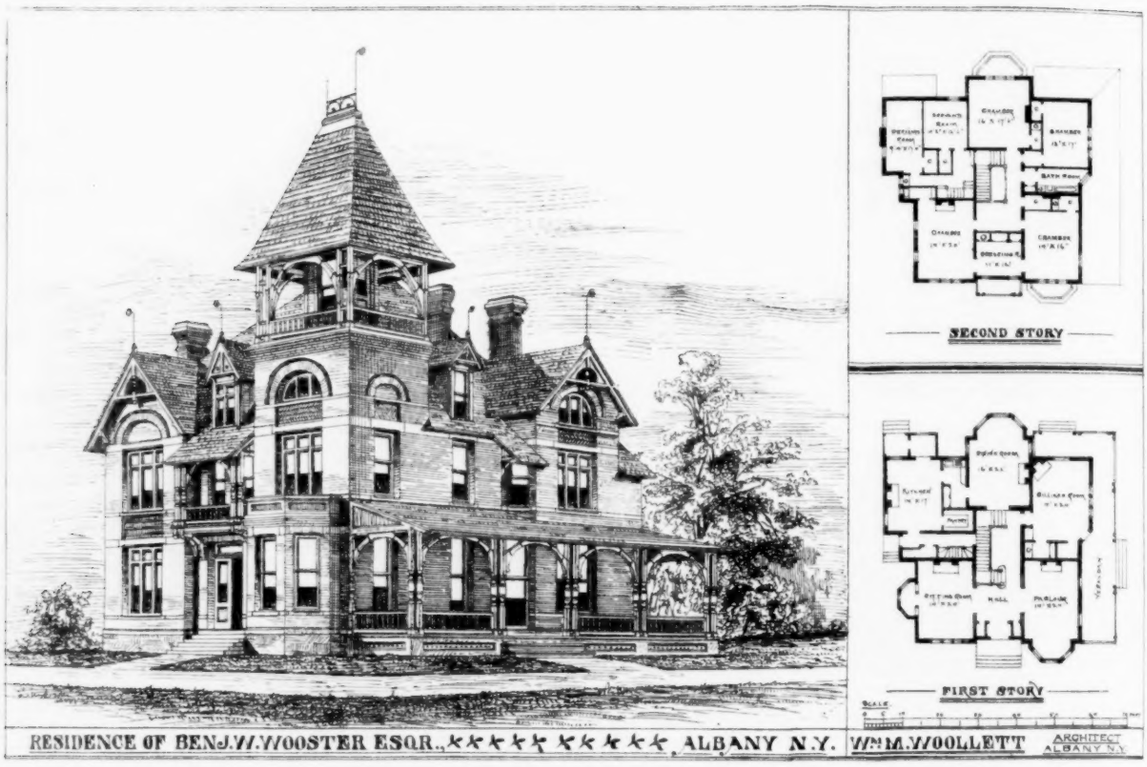

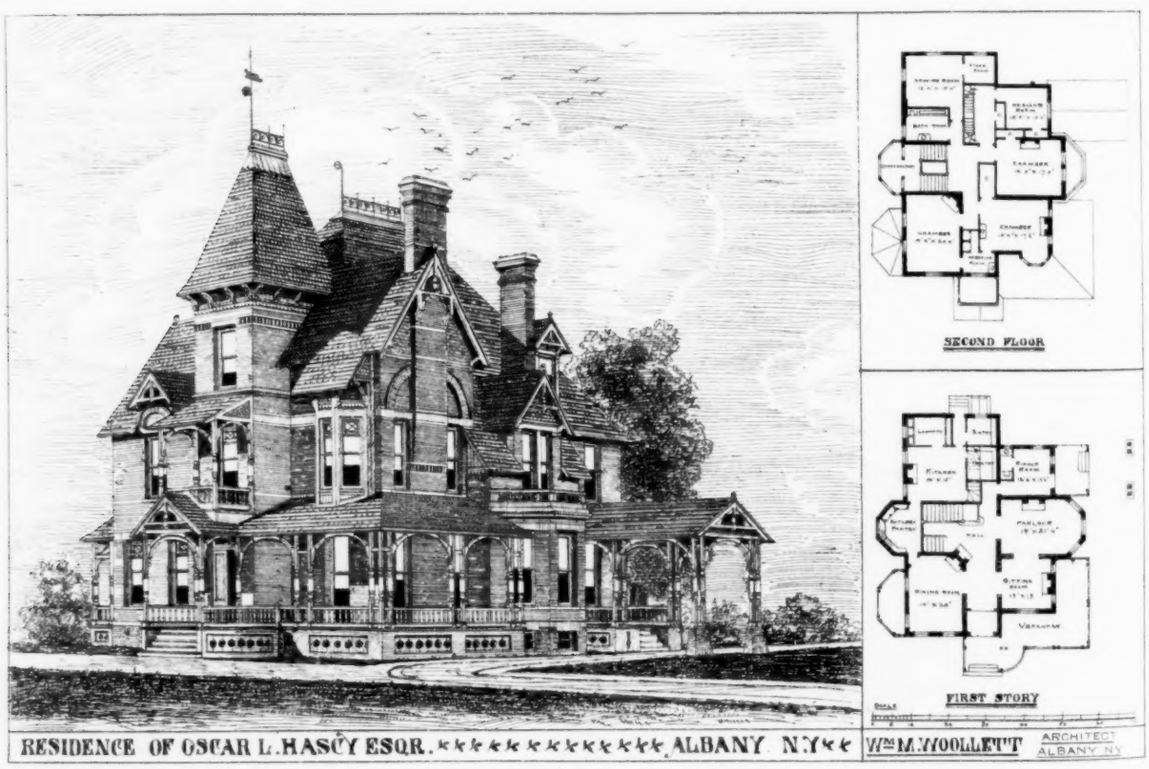

THE HELIOTYPE PRINTING CO. 330 DEVONSHIRE ST. BOSTON

U.S. COURT-HOUSE AND POST-OFFICE, UTICA, N.Y.

MR. J. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY.

VIEW ON BERKELEY ST. BOSTON.
DRAWN BY E.C. CABOT, ARCHT.

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON

absurd, *so long* as we allow the waste in other ways to be so large. If we throw away nine tenths of the fuel consumed, we cannot complain of the loss of the one tenth of the remainder which is unconsumed.

THE ILLUSTRATIONS.

U. S. COURT-HOUSE AND POST-OFFICE, UTICA, N. Y. MR. J. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

THIS building measures seventy-eight feet by one hundred and twenty-eight feet. Its basement walls are faced with granite from Clark's Island, Me., and the walls of its superstructure are faced with pressed brick relieved with stone-work. The Amherst Stone Company have the contract for the stone-work at $24,193. The basement is to be used for the heating apparatus and for storage purposes, while the plans show how the other floors are to be used. The floors and roof as well as the walls are fire-proof. The estimated cost is $225,000.

VIEW ON BERKELEY STREET, BOSTON, MASS. DRAWN BY MR. E. C. CABOT, ARCHITECT, BOSTON.

This is another of the series of drawings prepared by the members of the Portfolio Club.

VILLAGE CHURCH, TAININSKOJE, NEAR MOSCOW, RUSSIA.

We reproduce this interesting church from our Russian contemporary, the *Zodtchy*.

HOUSES FOR B. W. WOOSTER, ESQ., AND O. L. HASCY, ESQ., ALBANY, N. Y. MR. W. M. WOOLLETT, ARCHITECT, ALBANY.

These two buildings stand on adjoining lots facing Washington Park, the principal public ground in the city. The street in front of them being treated as a roadway of the Park, they will, to all appearances, stand within the Park inclosure. They are substantially built, and are faced on all sides with Trenton face-brick, laid in black mortar, and relieved with finish of Ohio stone. The gable-ends are shingled, and the roofs are slated.

CORRESPONDENCE.

THE TENEMENT-HOUSE COMPETITION.

NEW YORK.

NEW YORK, probably of all the cities in this country, has an interest in the tenement-house question. With such a large proportion of the gross building effort directed to this class of dwellings, the question of how best to cover valuable city lots so as to squeeze out a rich revenue in the way of rents without a too startling sacrifice of human life, and without too severe a mortality rate among the tenants, is one of the real tasks of the sanitary architect. It will not do to say that the whole thing is wrong from the start; that tenements should not be erected, and that in place of packing population away at the rate of 270,000 to the square mile, every effort should be made towards scattering the inhabitants of the metropolis out into the suburbs, or anywhere out of the great six-story barracks into two-story cozy cottages. All this may be true, and is true, but it is not practicable. We have the tenement-house population and they must be housed, and reforms, if any are to come, will only be worked out in the lapse of years. A more immediate obstacle to one reform which might be brought about in agglomerated tenements is the formal and arbitrary chopping up of city property into 25 by 100 feet plats. There is a perfect willingness on the part of real estate owners to pare down from this size, but the difficulty of selling and the inconvenience of holding buildings of larger size have made owners very shy of attempting the covering of large plats with single structures.

With these facts before them, and knowing well the necessity of at least striving after something better than the present wretched fever nests and pest holes, the proprietors of the *Plumber and Sanitary Engineer* united with Messrs. D Willis James, Frank B. Thurber, Henry E. Pellew, and Robert Gordon in instituting a competition for designs for a house for workingmen. Five hundred dollars was named as a premium to be divided into four prizes. The conditions were made very simple indeed. They supposed a lot 25 by 100 feet inclosed by buildings on adjoining lots at sides and rear. The model building was to be of brick with timber flooring. Various features were named as important to be secured by the designer. There was to be a security against fire, or, at least, against any sudden and rapid spread of fire, and as a means of escape fire-proof staircases open to the air were suggested. There was to be a proper distribution of light, by which was meant that the rooms of the tenements were to be something more than dark closets of various size. Ventilation, drainage, and other sanitary appointments were to be looked after. The plan was to be so devised that each suite of rooms should have the fullest share of seclusion, while there should be the utmost publicity of access to them. Convenience of arrangement and an inexpensiveness of construction were to be secured. Excellent and competent judges were chosen, and in December last the prospectus was sent out. The efforts of nearly 200 designers may now be seen at the Leavitt rooms in this city, where on the walls are tacked up 188 sheets of drawings, each sheet including the plan, elevation, and section of what the designer considered to be the best possible mode of putting the greatest number of people as dwellers upon the 25 feet by 100 bit of earth.

The result is a collection which took the projectors by surprise, and the range of the profession who are represented is somewhat surprising. Among the places from which plans were sent are London, Eng., Toronto, Ottawa, San Francisco, Chicago, St. Louis, Detroit, Grand Rapids, Princeton, Ill., Cleveland, Cincinnati, Toledo, Pittsburgh, Erie, Philadelphia, Baltimore, Washington, Buffalo, Albany, Brooklyn, Rochester, Rondout, Saratoga, New York, Jersey City, Bridgeport, New Haven, Springfield, Providence, and Boston.

The award of the judges is not to be made until the 18th instant; in the mean time the drawings are open to criticism. The plans are capable of a general classification since there are but few changes to be rung on such a restricted programme as the covering of a city lot. Not a few of the competitors fail, however, to appreciate, even in the remotest degree, what a New York tenement must be. With a building law which permits a six-story structure it is simply ridiculous to plan a two or three-story affair. It would not pay, and that suffices to lay such a drawing among the impracticables. Then, too, it is sheer nonsense to provide the tenement-house dweller of to-day with anything like the number of conveniences which appear on many of the plans, and the plea that they were to act as educational influences would not hold. A dumb-waiter, even of the simplest sort, would, in all likelihood, be a constant source of wrangling among the tenants. There are a hundred other minor points which, to one who is familiar with metropolitan low life, are at once detected, while it would require columns of space to explain the why and wherefore of each decision. The designs are, of course, under motto titles; and it would always be well if competitors would use words instead of emblems as distinguishing features: —

The Leader has a four-story building with a dark hall, but the rooms have outer light and air. The stairs are thrown to the central section, and with baths, elevator, etc., the whole has too much of the French flat. The front is plain.

Ferrum is rather odd. Its odd rooms with bunks for "men without families," and a cork-screw staircase, with the whole front as a fire-escape, show that the designer did not comprehend the problem.

Suprema est Lex Salus Populi builds the front in a bold way with large arches, puts a stairway at the front in an 8 ft. by 13 ft. well, then comes a long passage and eight rooms in line to the rear stairs.

Nutshell, 1879, has a poor plan with long passages, and puts the stairs in the centre of a well. He gives a very carefully designed ash-sifter, however.

A Greek cross in a quatre-foil constructs two separate buildings, with a 19 ft. well between them in which the wrought-iron stairway is fixed. It is a compact plan and gives variety of apartments.

Maison Ouvrière has a double entrance, one for first flat only, and in other ways it is a very wasteful plan.

Another for Hector has a stairway out of doors, very like a permanent fire-escape, and, with the three entrances, is too much of an innovation to be at once popular.

Homes has a single plan, a well 6½ ft. by 50 ft., with the stairs thrown to the centre of the plan.

Facimus in elevation shows six windows across a 25 ft. front. The building is not a tenement, but rather a community house, a general laundry being provided, but the rooms enjoy borrowed light, and this is not fulfilling the conditions.

Nor would you find it easy to compose is a long title for a poor plan; its passage-ways crossing wells.

No. 67 is a petty flat, with a pretentious-looking frontispiece. There are dozens like it in the city.

Stat Nomen in Umbra is a double house, with the stairways and offices thrown to central part. The elevation suggests a grain elevator, while the broad side entrance has the look of a cartway.

Unity shows a plan which has many dark rooms, and the plumbing as shown would have to be very carefully looked after.

Wi & W has a peculiar plan, and it is questionable whether a sitting-room without either fireplace or chimney is a correct sanitary arrangement. It shows a shaft next the outer open side.

Cleanliness next to Godliness is a very good plan, with outside light, but it is rather too gorgeous, too elaborate, for a New York tenement.

Diagonal Court sets out with a disregard of the idea that the next lot was to be built up. A diamond-shaped court is carried down in the plan, and where this is open at the angles to another court all may go well, but otherwise it may not.

Thor compels his first-floor tenant to travel back fifty feet, and generally makes too free a use of the ground. The stairways are thrown to the front.

Hope is symmetrical and double, but no specially novel features are shown.

Ante Legem places water-closets where there is no possible chance of outside ventilation, while he provides a liberal well for light and air on the opposite side.

Air is Life is very careful against fire, and makes elaborate preparations to ventilate the great shafts by making double floors below the first story. Whether this way of receiving air-ducts would be altogether satisfactory could only be settled by actual trial, and that would be expensive.

Ben Trovato puts a big well in a very small house, and therein does not meet the full problem.

New York provides permanent refrigerators and such luxuries, and a great fire-escape in front, but nevertheless has within the fault of dark rooms.

Metropolis, with a very heavy exterior, adopts the dumb-bell plan, or a constricted central section in which the stairs are arranged. The central rooms are dark, and the suites are so arranged that one room is passed through to reach another.

H. is a tenement in fact as we know them in New York, and the yard contains what is called a "close-poll" for holding pulley lines.

The Workman is a poor plan with much explanation in text. Its dark rooms are inadmissible.

Non Conscire Sibi is divided into three parts, with the stairs in the central shaft and bridges to front and rear. There is more in the plan than has been gotten out of it in this drawing.

Your Kind Consideration should have been better drawn. The stairways are securely placed in a central shaft.

Fiat justitia, ruat cœlum throws away half the front, and no New York capitalist would ever think of adopting such a plan.

H. M. has the fault of dark rooms, yet the front of the building has the look of a grand window.

Octagon has front and rear building with different levels of floors. The water-

closets are put in the centre, and with a fair elevation the whole design takes rank among the desirable ones.

Light, Air, and Health sends in four designs, showing differing plans. A. gets ventilation by wasting his ground. B. divides the lot into two parts with two sets of stairs. C. has the dumb-bell plan, with the dark rooms, and D. adopts the corridor plan. It is difficult to conceive of four situations where these plans would be severally required.

Sanitas gets three sets of plans on a floor, and takes two sets of stairs to reach them.

Posse Potens has a very elaborate plan, and not only duplicates the apartments on each floor, but the back-yard as well, and there are half a dozen of these appendages.

Improved puts a very conspicuous stairway at the front, but allows his plan to show dark rooms, and the only merit in the eyes of a builder is that it covers the lot.

Ut Prosim also covers the whole lot, and has three sets of stairs. The elevation suggests a shot-tower.

Lux has looked after the ventilation and has carried a hollow in the side wall from front to rear. A spiral stairway is not a recommendation to tenants.

Onyx makes a liberal use of the ground, but seems to have peculiar notions of tenement life, seeing that he provides the kitchens with drying rooms.

Peter Cooper shows a double house on a good plan, with the stairways carried to the centre.

Health is Happiness has prepared a good plan for a small town where compact accommodations are not required.

Si Placeat, a London designer, has a long side court, and a front elevation which would not discredit a Trappist monastery.

Cui Bono places a number of small buildings along the side of a court.

Oxygen presents an elevation with a double gable, and one of the most carefully studied plans in the collection. An open door and stair-wells give ample ventilation, and all the rooms have an out-door exposure.

Utility carries a passage down the centre and places the stairs in the central shank of the dumb-bell plan.

Suum Cuique carries up a stairway in a central tower in front, and has a laundry on the top floor in front. The rear of the lot has another staircase with light shafts.

E. L. has a dark hall, with two small courts. It is, however, a good plan and a compact one.

Midnight Oil adopts the side court plan with balconies on each floor. It is a good plan with a very careful elevation.

L. C. E. does not do justice to himself in a poor drawing.

Light and Air, also, has peculiar notions of what a metropolitan tenement is when he provides a "sewing-room" in conjunction with the dining-room; a spiral stairway in a well, and a front elevation which is certainly peculiar, mark this mistaken design.

The Poor offers a novel plan and design; a corridor nine feet wide is provided, and generally it is an innovation.

The poor ye have always with you has an upper and lower store, and a stairway further in the rear. There are dark rooms.

Householder, No. 1, has the ordinary dumb-bell plan, with a peculiar water-closet arrangement.

Bedtime puts a small building at each end of the lot and then a long, narrow building set diagonally across the court.

Excelsior has a great bay window in the front, but further back rooms are nominally lighted by those V-shaped breaks in the side wall.

Permitte Divis Cætera sends a careful drawing, with five windows across the elevation, but the passages are dark, and the rooms are lighted from some very small shafts.

Exitus Probat has the side court, with stairs at each end of it, with the water-closets in the rear. It is one of the best plans of its class, and, but for an unfortunate use of red ink in showing the piping, would stand a good chance for a prize.

17½ by 24 has the dumb-bell plan with the little V-shaped shafts, and gives the coveted "outside exposure."

Modernizer has designed a very ambitious elevation with an alternative design, — a double dumb-bell with a well in the centre, — making a very crowded plan.

Advance has two plans, of which No. 2 is best, being the most open.

Health is Happiness carries up a curious extension in the rear, and places a good-sized shaft in the centre of the front building.

Peabody obtains a good elevation, not at all showy; but the dumb-bell plan shows dark inner rooms.

Wyoming puts two buildings on the lot, with a fourteen foot court between. Each building has a circular stairway in it.

Comfort appears with dumb-bell plan, and tries to light a bedroom from a small shaft into which he also ventilates water-closets.

I strive is a side plan with a double shaft. It covers the whole lot, and compels the tenants to turn rooms into thoroughfares.

Excelsior designs a three-storied building, but puts water-closets into the corners of bedrooms as though they were ordinary clothes-presses.

Simplicity uses an open central well with the stairs winding about it.

Delta makes things very compact, so much so that a tenant may lie in bed in one room and stir the fire in the next.

I. F. S. H. has a double staircase and a passenger elevator, but nevertheless dark rooms.

Pro eo ac Merce makes a dumb-waiter the central feature of the house. The little V shafts are seen.

Comme il faut uses a stoop, and carries up the elevation into a Mansard; a corridor with two stairways is provided.

Pro Bono Publico, with anchor emblem, sends alternative designs, with the stairway in a side tower at the front, and again at the rear; but for the borrowed light in the central rooms the plan would be among the best in the collection.

Hard Cash has made some very picturesque drawings of a dumb-bell planned house, and the water-closets are well exposed, but the double dark rooms are met.

Eureka has a double dumb-bell plan, and puts side windows in the house, although the adjoining lots are supposed to be built up.

Präfet alles, das Beste behaltet, presents a wonderfully ingenious plan with a staircase tower in centre of front

Fais ce que dois; advienne ce que pourra, has an Italian tone about it with a court eighteen feet across and a balcony in centre. All the rooms are light.

Seven per cent has a good plan with a central shaft and stairs about it.

Dieu defend le droit sends in a design of a most elaborate character with a front to match; but a cost of over $16,000 will check building on that plan.

Health before Wealth has two buildings on the lot, but there are dark rooms in them.

A quatre-foil in a circle sends a low building, with three sets of stairs and a double light shaft. The plan is out of place.

Mutatis Mutandis provides a strong central stair shaft of brick, from which the front and rear building may be cut off at any floor. A general lavatory is a peculiar feature in this building.

Utility wastes room in private halls, while the stairway in the centre is dark.

Tentative has an interior court and a semicircular staircase abutting upon it.

Through Draft provides a store 6 by 11 feet, bedrooms 6 by 15, and such.

Bonâ Fide has one of the best elevations, with a dumb-bell plan, and corridors reaching each suite.

Light and Air covers the entire length of lot with side corridors from front corner stairs.

Pauper, in the front elevation, starts a main central pier boldly from the top of the arched front door. The plan is a peculiar one and leaves much vacant space at the rear of the lot.

Sunshine provides three houses with liberal air shafts between.

Qui peut plus, peut moins, of Boston, opens a court, 11 by 27 feet, at the side; he has considered such niceties as providing separate ash and swill chutes, and in fixing his suites makes the sitting-room answer as ante-room to the others.

Concours shows a plan where every room is an outside one, and of all the side-court plans this seems the best.

Domesticus shows something very near the old double-decker, so common in our city now, except that a court rises beside the stairway on one side.

The Hypothenuse Problem covers the full lot, with a design showing a good elevation above the first story.

Sun and Air raises a fantastic front, but in plan there is a waste of room, and dark bedrooms as well.

Pericles takes an air court, 15 ft. by 20 ft., in the centre and carries up his stairway beside it.

Geo. Peabody puts the stairs at each end of a long and dimly-lighted corridor

Pro Bono Publico has a plan which would answer admirably for a small hotel.

Ut Prosim shows a very fair elevation, but the plan is not commensurate with it.

Air and Light, No. 2, has an excellent plan, but the elevation is poor and should be improved.

Such is a brief mention of many of the plans sent in. Some fulfil the conditions, but many miss them, either from misconstruing the terms or from ignorance of what a tenement in a great city actually is.

W.

THE GHIBERTI GATES.[1]

This is, perhaps, the most attractive of the heliotype reproductions of the firm which publishes it. It is a slender quarto volume containing thirty-three plates in heliotype, very well executed, illustrating Ghiberti's famous eastern door to the Baptistery at Florence, with an explanatory text by Mrs. Julia A. Shedd. It would be unreasonable to expect that such a work should have the value of good photographs from the bronze itself, but these are not to be had without difficulty and expense, and many people who would like to have the photographs, but cannot, will be thankful for the opportunity to substitute the more accessible heliotypes. They are taken from the cast of the door in the Corcoran gallery at Washington, and include a heliotype of Canova's bust of Ghiberti in the Capitol Museum at Rome by way of a frontispiece, a very good view of the Baptistery itself, a view of the whole of the Eastern door, and enlarged prints of each separate panel, niche, and section of enriched border, the whole giving a very complete, detailed representation of Ghiberti's great work.

The chief criticism that the illustrations suggest touches the way they are lighted. It is evident that the cast was photographed by artificial light, perhaps necessarily. The light was concentrated on one side, and very low, almost at the bottom of the door. The effect of this is very injurious. The shadows are exaggerated and misplaced, and the half-tints inevitably lost, so that the whole is thrown out of balance. This necessarily does injustice to the effect of the compositions, bringing the lights and darks into positions and relations which were not intended. The alteration of effect is increased by the difference between the white color of the cast and the dullness of the bronze. By this the bold relief and modelling and cast shadows are made to tell with exaggerated force, while the strongly concentrated light and shadow obscure the modelling of the figures, which is already somewhat lost in the plaster reproduction. It is a delicate matter to photograph any piece of sculpture by artificial light, especially one of so complicated effect and so much small detail as these bas-reliefs, and should not be undertaken without the supervision of a skilful artist, who can enter into and preserve, as far as may be, the character of the original work. The faults we have here noticed will be seriously felt by artists, but enough remains of the beauty of the original sculpture to make the reproductions valuable for reference and study notwithstanding.

ANTIQUARIANISM IN RHODE ISLAND.

AMERICAN INSTITUTE OF ARCHITECTS: RHODE ISLAND CHAPTER.

Providence, February 10, 1879.

At a meeting held February 5, a committee, previously appointed to consider and prepare a scheme for interesting the architectural draughtsmen and students of the State in the work of the Chapter, made a report in print, which was adopted and ordered to be carried into effect. In accordance with this report the Chapter invites all architectural students and draughtsmen of Rhode Island, without distinction of age or sex, to unite with it in preserving a record of such ancient buildings, especially those built in colonial times, as may be worthy of such notice, and to this end has instituted a competition, the special prizes and terms of which may be learned on ap-

[1] *The Ghiberti Gates:* An Account of Lorenzo Ghiberti, and the Bronze Doors of the Baptistery at Florence. By Mrs. Julia A. Shedd. Boston: Houghton, Osgood and Company; The Riverside Press, Cambridge. 1879.

plication to the Secretary of the Chapter. It is proposed to make a public exhibition of all drawings sent in response to this invitation, appending, to those receiving prizes or honorable mention, the names of the authors, amount of award, etc. There are many buildings in the State, interesting from their historical associations, architectural merit, or as types of colonial buildings, and it is hoped that we may thus be enabled to obtain a worthy record of them. The selected drawings are to be bound or otherwise preserved, by the Chapter, the author being allowed to make copies of them if he so desires. Drawings must be sent, anonymously, to the Secretary, before September 27, in order to receive consideration.

CHAS. P. HARTSHORN, *Secretary.*

The invitation addressed by the Chapter to draughtsmen runs as follows: —

THE R. I. CHAPTER A. I. A. invites the architectural students and draughtsmen of the State to coöperate with the Chapter in making and preserving a record of the noteworthy buildings erected in the State from the date of its settlement, and especially of those built in the colonial times. To accomplish this object the Chapter invites you to participate in a competition, the terms of which are appended for the guidance of those who take part therein, and offers the following suggestions and directions as to selection of subjects, and method of illustration: —

FIRST. That a building be chosen because of its historical associations, because it is a characteristic example of a type of building, or because it possesses, to the eye of the student, architectural merit, as a whole, or in part, which deserves to be recorded and preserved.

SECOND. That after such selection, accurate sketches, measurements, and surveys of the buildings be made, including the fences and out-buildings when they possess marked architectural features, observing and recording peculiarities of construction and detail, especially noting the changes which have been made, the date when they were made, and the points of resemblance, or otherwise, between the new parts and the original structure.

THIRD. To draw out carefully to a scale the building and its various parts, in such manner as the student may prefer, in order to make clear the character of the structure as a whole, and to illustrate its details; the drawings to include a neatly drawn pen-and-ink perspective sketch of the building.

FOURTH. To send with the drawings a manuscript containing a description and historical sketch of the building.

TERMS OF THE COMPETITION.

The competition is open to all architectural draughtsmen and architectural students in the State, without reference to age or sex. All of the drawings must be anonymous to the Chapter, and must be marked with a cipher or motto, and accompanied by a sealed envelope designated by the same cipher or motto, and containing the name of the author of the drawings submitted. The drawings must be made on sheets of Bristol board, or of Whatman's hot-pressed paper, 14 in. x 22 in., with at least 2 in. margin, but as many sheets may be used as are desired by each author.

The Chapter will give four prizes, as follows: —

1st Prize, $15.00; 2d Prize, $10.00; 3d Prize, $5.00; 4th Prize, $3.00; or any architectural or scientific works of equal value.

The Chapter will be governed in the distribution of the prizes by the excellence of the selection and the method of its treatment, having reference not only to the accurate and graphic drawing of the buildings and the details thereof, but also to the arrangement of the drawings and the description of the structure, and honorable mention will be made of such other drawings as are, in the opinion of the Chapter, worthy of such distinction.

The Chapter will retain all drawings upon which prizes are paid — giving the authors an opportunity to copy them if they desire to do so, and would be glad to retain those which receive honorable mention, and pledges itself to carefully preserve them and to bind or otherwise dispose of them so that they can be easily inspected and exhibited.

If the response to this invitation is as liberal as is anticipated, it is proposed to make a public exhibition of *all* the drawings received, appending to those which receive the prizes or honorable mention the name and address of the author thereof, and the prize awarded to it.

Drawings may be sent (post-paid) to the Secretary, CHAS. P. HARTSHORN, 6 Exchange Street, Providence, on or before 12 M., of Saturday, the 27th day of September, 1879, and any received after that date will not be entitled to a prize, unless it is shown that it was by accident and no fault of the author, that the drawings were delayed in delivery.

For further information address the Secretary, or any member of the Chapter.

A. C. MORSE, Pres't, 42 Wilcox Building, Providence. ALFRED STONE, V. Pres't, 65 Westminster St, Providence. C. P. HARTSHORN, Sec'y, 6 Exchange St., Providence. GEO. C. MASON, Jr., Treas., Pelham St., Newport. CHAS. E. CARPENTER, 65 Westminster St., Providence. GEO. W. CADY, 164 Westminster St., Providence. JAMES MURPHY, 54 North Main St., Providence. DUDLEY NEWTON, Bellevue Ave., Newport. JAMES FLUDDER, Bellevue Ave., Newport.

VOLCANOS AND THE MICROPHONE.

IN an article communicated by Professor de Rossi of Rome to the *Bullettino de Volcanismo Italiano*, we find an interesting account of some experiments with the microphone and telephone combined, to determine how far these instruments will serve in the science of terreous meteorology, and the result seems to be highly satisfactory. In 1865, and, therefore, some years before Mr. Edison made himself so much talked of, Professor Mocenigo of Vicenza published an account of an instrument of his invention, containing all the fundamental principles of the microphone; but as he devoted himself chiefly to perfecting it, with a view to its usefulness in his special branch of science, meteorology, the microphone was invented while he was still studying. Professor Rossi at once saw the possible importance of the new invention, and, as in some experiments made at Vicenza, the telephone emitted sounds which could only be attributed to subterranean agitations, he determined to make some further experiments himself in an underground observatory of his own at Rocca di Papa, situated on the Alban Hill, on the edge of the crater of an extinct volcano. A special microphone, capable of being attached firmly to the rocks so as to feel any motion there might be, was carried down with great care into the observatory, and the professor anxiously sat by it till late into the night, waiting for the hour when all was at rest and silent, to catch any sounds that might issue from the telephone. He soon found that the mysterious sounds mentioned to him by his brother professor were not fanciful; and, though uncertain as to their causes, he was soon able to divide them into three classes, which he calls rumblings, musketry reports, and metallic or bell-like sounds. He also discovered that the sounds were periodical at intervals of an hour, or half an hour, or even smaller fractions.

"Meanwhile," he says, "nature was favorable to scientific inquiry, for on one side Vesuvius was becoming active, on the other several slight shocks of the earthquake were felt at Rocca di Papa; thus it happened that twice I was listening to the telephone when slight shocks were felt, and I noticed then that they were preceded and accompanied by the sounds I have described. This happened while Vesuvius was increasing in eruptive activity; and on the night of the 22d of September, at the hour when the explosions of the volcano and its eruptive cone were most vigorous, my microphone on the Latin hills was in the greatest agitation. On the following days the same sounds continued, following more or less exactly the course of the eruption of Vesuvius. Wishing, however, to complete my evidence, I determined to carry my microphone to a place where there was no doubt of being on ground vibrating from inner causes — to the sides of Vesuvius and the Solfatara of Pozzuoli. Professor Palmieri not only put at my disposal his observatory, but did all in his power to make the experiment a fair one, himself watching at the outer door to prevent all intrusion or accidental noises. We wished here to establish the connection between the motions of the seismograph and the sounds communicated by the microphone. To ascertain this, one of the assistants of the observatory stood over the seismograph, to mark the motions with signs previously agreed upon, to record the agitation preceding a shock, the actual shock itself, and whether the motion was undulatory or perpendicular. At the same time the sounds of the telephone were noted, and found to correspond exactly with the motions of the seismograph; and each different motion corresponded to a different sound. In this way it was possible to ascertain the value of the different sounds, which had naturally been impossible at Rocca di Papa; and it appeared that the perpendicular motion corresponded to the musketry reports, and the undulatory to the rumblings; while very often there was an uncertain sound, as had been noticed at Rocca di Papa. It appears, too, that the microphone, when placed on ground continually agitated, works with great energy even when not accurately adjusted, and this became still more evident when taken to the Solfatara of Pozzuoli. Here, indeed, I expected greater results than on Vesuvius, as the area of eruption is more confined, and it was more easy to approach the centre of activity; and I was not disappointed, for the microphone, before being adjusted, when artificial vibrations had no effect on it, repeated violently the shocks and rumblings at the bottom of the crater. When the balance had been slightly adjusted the reports became so loud that there was no necessity for holding one's ear to the telephone, and it was quite sufficient to place it on the table for every one present to hear the sounds. Learning that I was about to repeat the experiment, many people came to assist, and all, but chiefly the ladies, could hardly repress a feeling of fear at hearing the force, rapidity, and variety of the sounds, which showed what a terrible furnace we were standing over. The most interesting part to me, however, was that there was no difference, except in intensity, between these sounds and those heard at Vesuvius and Rocca di Papa; and it was hence evident they all proceeded from volcanic sources. But while our ears were filled with these noises there was no sensible motion experienced, as I had also remarked on Vesuvius, and, except in the two moments of earthquake, at Rocca di Papa. Still, it is evident that the microphone both at Vesuvius and the Solfatara was registering shocks of earthquake otherwise imperceptible; and, as the same sounds had been observed by Professor Mocenigo at Vicenza, and Armellini at Rome, there can be no longer any doubt of the existence of microseismic vibrations of the earth as discovered by Bertelli and maintained by me. In other experiments I have found it sufficient to place an ordinary watch under a nail and pass the electric current through this simple medium to catch the seismic sounds. The first thing, then, that science requires in the application of the microphone to meteorology is to obtain an instrument which will mark automatically all the variety of sounds which the microphone conveys to us; and this will be the much-desired 'panseismograph,' which will show the number, form, and every variety of the vibrations of the earth." — *Pall Mall Gazette.*

NOTES OF EXPERIENCE AND INEXPERIENCE.

[EXPERIENCE.]

1. ROOFING PAINT. — "Y," under "Notes of Inexperience," asks for a good, inexpensive paint for country house roofs. I have tried many colors and materials, and have found no low-priced article better than the so-called "Turkey Red" of E. & F. King & Co., Boston. It is a better color for coarse work than the ordinary Indian red, and costs about one quarter as much (*i. e.*, about two cents a pound in the dry color). There is also a color, made by the same firm, from the "Gay Head" earth, and called "Wing's Red," which is sold for one cent a pound or less, dry. This is about the tint of hard burned Philadelphia pressed brick. It grows somewhat lighter by exposure, but still is a very good color for a roof. To make a good roof, the shingles should have the butt-ends dipped, for about an inch, into thin paint, which should be smoothed up with the brush for a short distance on the under side, and for about two laps on the upper side and edges. Another coat should be applied over the entire roof after laying; treated in this way, if the shingles are of good quality, they will be very durable. If painted only after laying they will not last so long as if left unpainted.

JOHN A. FOX.

FIELD'S FLUSH TANK. — C.'s experience with Field's Flush Tank differs from mine in two respects. Perhaps the fact that his is buried deep in the ground, and consequently retains its heat longer, accounts for its working so very long without interruption from grease. Mine is mainly above ground, and we have to clear it out about twice a year.

On the other hand, I don't see how — even with the digging needed to get at it — the work could have cost $6! It takes less than an hour for one man to clean mine thoroughly, — very much less than the time that had to be spent on the drain and the absorption pipes before we used the Flush Tank, when obstruction was of frequent occurrence. W.

5. Saylor's Portland Cement. — In answer to "Mason's" inquiries we send the following report of a test on one thousand barrels delivered to the New York Department of Docks; stock is always fresh as it leaves our hands, and you should be able to get it fresh and in good condition from Messrs. R. G. Morse & Co., 498 Albany Street, Boston, Mass. Also, of Messrs. D. Roby & Co., 280 Causeway Street, Boston, as they are regular buyers. Johnson & Wilson.

Copy of Report from the Department of Docks, New York, of 1,000 *Barrels of Saylor's American Portland Cement.*

(Tested November 13th to December 20th, 1877.)

Lighter.	Vessel.	Marks of Cargo.	Date of Receipt.	No. of Bbls.	Average Gross Weight per Bbl.	Average Weight of U. S. Bushel.	Lining.	No. Bbls. from which Sample was taken.	No. of Bbls. Damaged.	Average Fineness.	Average Tensile Strain per Square Inch.	Cracks.	Number of Minutes in Moulds.	Remarks.
Saylor's American Portland Cement.			November 12 to December 6, 1877.	1,000.	400 lbs.	131 lbs.	Good.	105.	None.	82 per cent.	347 lbs.	None.	53 minutes.	

The requirements of this Department in purchasing were as follows: —

Weight per bbl. . . .	400 lbs.
Weight per bushel . .	110 lbs.
Fineness	80 per cent.
Tensile strain per square inch at seven days . .	250 lbs

To G. S. Greene, Jr.,
Engineer-in-Chief.
New York, December 21, 1877.

W. W. Maclay,
Assistant Engineer.

[inexperience.]

6. Centrolinead. — I have heard draughtsmen speak of the "centrolinead," an instrument used for perspective drawing. Can any one tell me how it is used, and whether it is worth buying? Is it the same thing as the "Perspective Linead" which I have seen advertised in the *American Architect?* Vanishing Point.

7. Georgia Pine. — Has any one ever experimented on the difference in strength between hard-pine timber from virgin trees, and that from trees which have been tapped for turpentine? And if so, what is the amount of the deterioration? It is something serious, and it would be worth while, also, to know the best way of specifying and recognizing timber which has not been exhausted of its sap. Georgia.

NOTES AND CLIPPINGS.

Poisonous Papers. — In a series of samples of glazed and plated papers examined for the State Board of Health, and intended to be used largely by children, Prof. E. S. Wood has found arsenic present in dangerous amount in all but one of the greens, one scarlet and one red, and a small quantity in one blue and one chocolate brown. (*Note from the Mass. State Board of Health.*)

A New Florentine Museum. — The *Academy* states that the invaluable stores of antiquities which are centered at Florence, in the Etruscan Museum, the Uffizi Gallery, and elsewhere, are so crowded together and so confused in arrangement that they are almost valueless for the purposes of study and instruction. As an instance of their condition, it states that there is a collection of about thirty thousand medals hidden away because there is no space where they can be exhibited. This being confessedly the case, the project of forming a separate archæological museum is once more agitated, and as it will not be necessary to build a new building, the government will probably carry it into effect.

A Voltaic Pencil. — We copy from the Detroit *Free-Press* the following item, hoping that some of our readers may be able to imagine the apparatus and the manner of using it, which are thus rather blindly described: —

An important discovery has just been made at Paris by M. Bellet, whose invention consists of a voltaic pencil, by the use of which designers and draughtsmen will be enabled to dispense entirely with the aid of the engraver. Beautiful proofs of lithographs and etchings have been obtained by the effect of a voltaic arc produced at the point of an ordinary lead pencil. The inventor has taken out patents in various countries and a company has been formed to carry out the process, which will soon be placed before the public.

To Turn Oak Black. — According to the *Revue Industrielle*, Paris, oak may be dyed black, and made to resemble ebony, by the following means: Immerse the wood for forty-eight hours in a hot saturated solution of alum, and then brush it over with a logwood decoction, as follows: Boil one part of best logwood with ten parts of water, filter through linen, and evaporate at a gentle heat until the volume is reduced one half. To every quart of this add from ten to fifteen drops of a saturated solution of indigo. After applying this dye to the wood rub the latter with a saturated and filtered solution of verdigris in hot concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained. Oak stained in this manner is said to be a close as well as a splendid imitation of ebony.

Bamboo in the Industrial Arts. — A company has been formed in England, with a large capital, for the more extensive and various utilization of bamboo in the arts of industry, the enterprise having its origin in the multitude of uses for which the material is and for so long a time past has been employed in India. Besides being used in the latter country in the construction of the implements of weaving, bamboo is there utilized for almost every conceivable purpose for which wood is resorted to in other countries. It forms the posts and the frames of the roofs of huts; scaffoldings for building houses; raised floors for storing produce, in order to preserve it from damp; platforms for merchandise in warehouses and shops; stakes for nets in rivers; bars, over which nets are spread to dry; the masts, yards, oars, spars, and decks of boats. It is used in the construction of bridges across creeks; for fences; as a levee for raising water for irrigation. It is the material of which several agricultural implements are made, as the harrow, the handles of hoes, clod-breakers, etc.; hackeries or carts, doodles or litters, and biers, are all made of it; and a common mode of carrying light goods is to suspend them from the end of a piece of split bamboo laid across the shoulder. Further, a joint of this material serves as a holder of many articles as pens, small instruments, and tools, and as a case in which the little articles are sent to a distance; a joint of it also answers for the purpose of a bottle, and is used for holding milk, oil, and various fluids, a section of it constituting the measure for liquids, in bazaars. A piece of it, of small diameter, is used for a blow-pipe to kindle the fire, and by gold and silversmiths in melting metals. It also supplies the place of a tube in distilling apparatus. These, of course, comprise but a portion of the uses for which this valuable material is applicable, and it opens up a wide field for manufacturing industries. — *Lumberman's Gazette.*

Gaur, a Bengalee City of the Past. — The London *Saturday Review*, in speaking of the late J. H. Ravensham's book, "Gaur: Its Ruins and its Inscriptions," says: The forsaken mosques and palaces of Gaur in Bengal are not, indeed, enigmas of decay, for we know something of the changes of affairs which drove away the rulers and the subjects, the Mussulman and the Hindoo, the saint and his worshippers. The spectacle of vast desolation, half covered by the work of nature, by flowers, palms, and ferns, is still one of the most remarkable that India has to show. In a deep jungle, about eight miles from the English station of Maldah, and on the banks of a stream which joins the Ganges, are the monumental relics of a vanished civilization. The jungle is seamed in every direction by strong embankments and deep trenches, by the fragments of old fortifications, and by roads which are scarcely trodden save by wild beasts. The piles of bridges and of viaducts stand out in the midst of the waste like those which, arrayed on the Roman Campagna, have been compared to lines of mourners following a nation's funeral. Here and there among the tangled branches are fragments of carved marble or of hornblende, which have been torn from their places by the cupidity, and left to moulder unseen by the indolence, of Calcutta tradesmen. The forest is full of lagoons, where the people of the city once drew water, and where the alligator now splashes through the rank grass and weeds. What Gaur was seven hundred years ago, and what was its history before it fell into the hands of Mohammedan conquerors (A. D. 1198), is not accurately known. The victors naturally defaced, as well as they might, all remains of Hindoo art. The temples were sacked, the images broken, the peace of the imperturbable gods was shattered with blows of battle-axes and maces. Yet the materials were not wasted, and the Mohammedan invaders were more gentle than the Puritan mobs of England or the Protestant roughs of the Scottish Reformation. The marble facing of the temples were reversed, and carved in the taste of the new masters of Gaur, so that one side of a fallen stone may now show delicate ornamental tracery, while the other preserves the image of some Hindoo deity. The second period of the prosperity of Gaur lasted till about the date of the fall of Constantinople. Gaur, according to the Portuguese historian, Faria y Souza, contained 1,200,000 inhabitants, and was so crowded that at the season of religious festival, many people were trodden to death in the streets. Yet the streets were "broad and straight," and were lined on both sides with trees to protect men from the heat of the sun. After the rapine and ruin of the Abyssinian dynasty of usurpers (1487) Gaur flourished again under Husaian Shah and his descendants (1494–1537). In the latter year it was sacked by the officers of Sher Khan, and in 1575 it was depopulated by the plague. Thus since 1575 Gaur has been "the abode only of tigers and beasts of prey," and has only been visited by a few travellers and artists.

A Cement for Glass and Metal. — A great deal of difficulty is experienced in cementing metal to glass. The *Faerber Zeitung* says that a mixture of two parts finely ground litharge and one part white lead, worked up to a stiff paste, with three parts boiled oil and one part copal varnish, adding more litharge and white lead as required, is the best material for joining the two substances.

The Nile Floods. — In the *Journal of the Society of Arts* Mr. B. Francis Cobb, F. S. S., says: "Another serious matter hangs on a good or bad Nile. After a bad Nile it becomes low Nile in February instead of June the next year. It was so in 1869, when the heat and the desiccation of the country in the early part of the summer were terrible, and there being no head of fresh water inland to filter through and balance or keep out the salt water of the sea, it, by its greater specific gravity, percolated inland, and supplied the wells of Alexandria, tainted the water works, and salted the Nile for seven miles inland. At Rosetta the water was unfit for man or beast, — the cattle died from it, vegetation languished and people gave famine prices for a goat's-skin of muddy, stinking water from such ditches in the country as the sun had not evaporated. The dock gates of the Mahmoudieh Canal were accused of letting in the salt water from the sea to the canal. M'Killop Pasha was accused of dredging the canal too deeply; the wildest notions went abroad; a special commission sat and deliberated upon the subject. However, perhaps the real cause of this salting of the fresh water supply of Alexandria is better understood by this time, and if we may judge by the remains of the extensive reservoirs of Roman construction in Alexandria, the Romans had no doubt found this out, and made these reservoirs to lay in a stock of fresh water to serve them during the low Nile periods."